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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/581,612

06/05/2006

Satoshi Mogi

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07/30/2009

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER

CHUO, TONY SHENG HSIANG

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

07/30/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/581,612	Applicant(s) MOGI ET AL.	
	Examiner Tony Chuo	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 June 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/22/06</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 12/22/06 was filed on 12/22/06. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

3. Figures 8 and 9 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear how a second electrode can be used as an electrical connection means. Typically, electrical connections are made of electrically conductive materials and electrodes for SOFC are made of ceramic materials.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 3, 5, and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Shibata et al (JP 2002-329508).

Regarding claim 1, the Shibata reference discloses a fuel cell stack comprising at least one structural member, wherein each structural member comprises: two

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membrane electrode assemblies (electrolyte/electrode bonded members), each comprising a first electrode "11", a second electrode "10", and an electrolyte membrane "12" disposed between the electrodes; a porous metal base "2" (conductive porous substrate) disposed between the two membrane electrode assemblies so as to be in contact with the two first electrodes "11", a conductive support member (connection line shown in right side of Drawing 2) provided on the porous metal base "2" so as to be electrically connected to the porous substrate and the two first electrodes, and an porous metal base "1" (electrical connection means) for electrically connecting the two second electrodes "10" of the membrane electrode assemblies, which are not in contact with the porous substrate (See paragraph [0025] and Drawing 2).

Regarding claim 3, it also discloses an electrical connection means "1" that electrically connects the two second electrodes of the two membrane electrode assemblies, via an insulating material "14" that covers side surfaces of the porous substrate "2" and the two membrane electrode assemblies (See paragraph [0033] and Drawing 4).

Regarding claims 5 and 6, it also discloses an insulating support member/sealing material "14" that is disposed on the membrane electrode assembly (See paragraph [0033] and Drawing 4).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

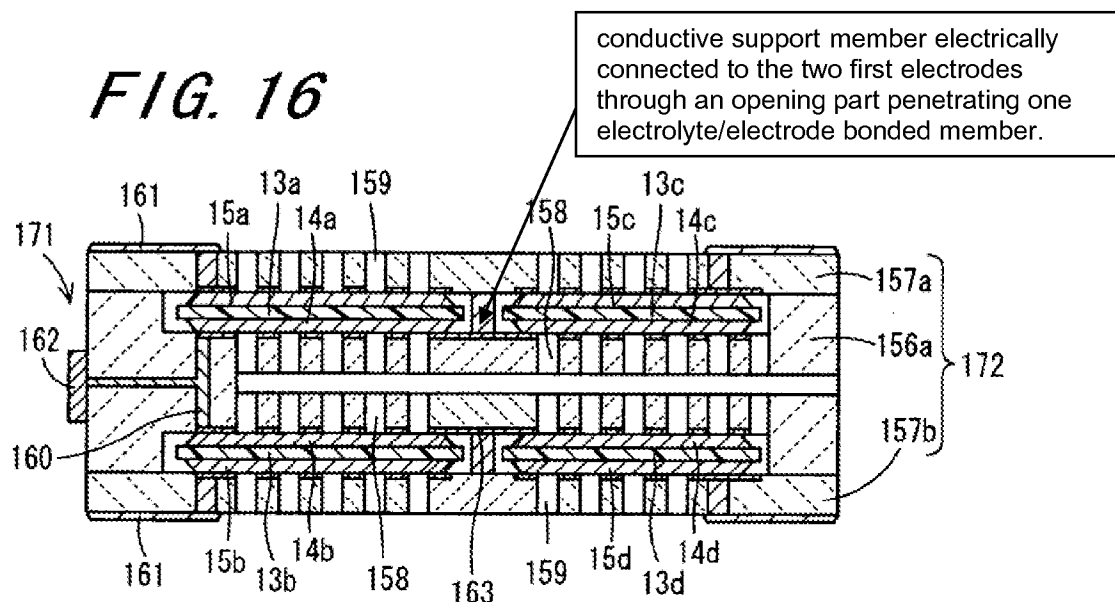
10. Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shibata et al (JP 2002-329508) in view of Sugai et al (US 2004/0142227). The Shibata reference is applied to claim 1 for reasons stated above.

However, Shibata et al does not expressly teach a conductive support member that is electrically connected to the porous substrate and the two first electrodes through an opening part provided penetrating one electrolyte/electrode bonded member; or a stack of at least two of the structural members, wherein the second electrode of the electrolyte/electrode bonded member of a first structural member and the second electrode of the electrolyte/electrode bonded member of an adjacent second structural member are stacked so as to face each other via an insulating sealing material, and the conductive support member connected to the first electrode of the electrolyte/electrode bonded member of the first structural member and the second electrode of the electrolyte/electrode bonded member of the adjacent second structural member are electrically connected, whereby the electrolyte/electrode bonded members of the first structural member and the adjacent second structural member are connected in series.

The Sugai reference teaches a conductive support member (see Figure 16 below) that is electrically connected to the two first electrodes "14a" & "14b" through an opening part provided penetrating one electrolyte/electrode bonded member; a second electrode "14a" of a first membrane electrode assembly and a second structural electrode "14b" of an adjacent second membrane electrode assembly that are stacked

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so as to face each other via an insulating sealing material "156a", and an conductive support member "164" connected to a first electrode "14a" of a first membrane electrode assembly and a second electrode "15b" of an adjacent second membrane electrode assembly that are electrically connected, whereby the first membrane electrode assembly and the second membrane electrode assembly are connected in series (See Figures 16 and 17).



Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Shibata fuel cell stack to include a conductive support member that is electrically connected to the porous substrate and the two first electrodes through an opening part provided penetrating one electrolyte/electrode bonded member; and a stack of at least two of the structural members, wherein the second electrode of the electrolyte/electrode bonded member of a first structural member and the second electrode of the electrolyte/electrode bonded

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member of an adjacent second structural member are stacked so as to face each other via an insulating sealing material, and the conductive support member connected to the first electrode of the electrolyte/electrode bonded member of the first structural member and the second electrode of the electrolyte/electrode bonded member of the adjacent second structural member are electrically connected, whereby the electrolyte/electrode bonded members of the first structural member and the adjacent second structural member are connected in series in order to utilize an insulating layer between two structural members so that the first structural member is able to be electrically connected to the second structural member in series, thereby providing higher output voltage from the fuel cell stack.

11. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shibata et al (JP 2002-329508) in view of Ernst et al (US 5945232). The Shibata reference is applied to claim 1 for reasons stated above.

However, Shibata et al does not expressly teach a stack of a first stacked member and a second stacked member each comprising a stack of at least two of the structural members, wherein the first and the second stacked members each has a constitution such that the second electrodes of the electrolyte/electrode bonded members of adjacent structural members are disposed so as to face each other via an insulating sealing material, the conductive support member connected to the first electrode of the electrolyte/electrode bonded member of one of the adjacent structural members and the second electrode of the electrolyte/electrode bonded member of the other of the adjacent structural members are electrically connected, and the conductive

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support member of the structural member positioned at an end of the stacked member has a portion exposed outside of the stacked member, and wherein the exposed portions of the conductive support members of the first and the second stacked members are electrically connected to form the stack of the first and the second stacked members; or a stack of a first stacked member and a second stacked member each comprising a stack of two of the structural members, wherein the first and the second stacked members each has a constitution such that the second electrode of the electrolyte/electrode bonded member of the first structural member and the second electrode of the electrolyte/electrode bonded member of the adjacent second structural member are disposed so as to face each other via an insulating sealing material, the conductive support member connected to the first electrode of the electrolyte/electrode bonded member of the first structural member and the second electrode of the electrolyte/electrode bonded member of the adjacent second structural member are electrically connected, and the conductive support member of the adjacent second structural member has a portion exposed outside of the stacked member, and wherein the exposed portions of the conductive support members of the first and the second stacked members are electrically connected to form the stack of the first and the second stacked members. The Ernest reference teaches the concept of a fuel cell stack comprising multiple sub-stacks, wherein the sub-stacks are electrically connected in series, parallel, or a combination thereof within the main fuel cell stack to provide a higher output voltage (See column 3, lines 49-55).

Examiner's note: Claims 8 and 9 of the present application are construed as reciting a first stacked member (first sub-stack) and a second stacked member (second sub-stack) that are electrically connected in parallel, wherein the structural members (sub-sub-stack) of each stacked member are electrically connected in series, and wherein the electrolyte/electrode bonded members (membrane electrode assemblies) of each structural member are electrically connected in parallel. The examiner contends that it is within the level of skill of one of ordinary skill in the art to configure the Shibata fuel cell stack to include sub-stacks and sub-sub-stacks such that the sub-stacks are electrically connected in parallel, the sub-sub-stacks are electrically connected in series, and the membrane electrode assemblies are electrically connected in parallel.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Shibata fuel cell stack to include a stack of a first stacked member and a second stacked member each comprising a stack of at least two of the structural members, wherein the first and the second stacked members each has a constitution such that the second electrodes of the electrolyte/electrode bonded members of adjacent structural members are disposed so as to face each other via an insulating sealing material, the conductive support member connected to the first electrode of the electrolyte/electrode bonded member of one of the adjacent structural members and the second electrode of the electrolyte/electrode bonded member of the other of the adjacent structural members are electrically connected, and the conductive support member of the structural member positioned at an end of the stacked member has a portion exposed outside of the stacked member, and wherein the exposed

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portions of the conductive support members of the first and the second stacked members are electrically connected to form the stack of the first and the second stacked members; or a stack of a first stacked member and a second stacked member each comprising a stack of two of the structural members, wherein the first and the second stacked members each has a constitution such that the second electrode of the electrolyte/electrode bonded member of the first structural member and the second electrode of the electrolyte/electrode bonded member of the adjacent second structural member are disposed so as to face each other via an insulating sealing material, the conductive support member connected to the first electrode of the electrolyte/electrode bonded member of the first structural member and the second electrode of the electrolyte/electrode bonded member of the adjacent second structural member are electrically connected, and the conductive support member of the adjacent second structural member has a portion exposed outside of the stacked member, and wherein the exposed portions of the conductive support members of the first and the second stacked members are electrically connected to form the stack of the first and the second stacked members in order to configure the fuel cell stack in a combination of series and parallel connections to provide a higher desired output voltage from the fuel cell stack.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571)272-0717.

The examiner can normally be reached on M-F, 9:00AM to 5:30PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795

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